

Type-II Interband Cascade Lasers: Review and Prospects

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Interband cascade (IC) lasers that utilize optical transitions between the conduction and valence bands in a staircase of Sb-based type-II quantum wells [1] represent a promising approach for efficient mid-IR diode lasers. Optimistic theoretical calculations have suggested the feasibility of IC lasers operating in cw mode up to room temperature with output powers approaching 1 W/facet [2,3]. Also, significant advances in the development of mid-IR type-II IC lasers were made with very encouraging results [4,5] such as record-high peak power (~ 6 W/facet) and power efficiencies ($>14\%$ in cw mode, $>18\%$ in pulsed mode). However, the ultimately high-performance predicted by theories has remained to be achieved with substantial distances.

In this talk, I will review the progress made in the past years and discuss the issues encountered during the development. The status of type-II IC lasers will be updated to my knowledge. Also, challenges and prospects for further developing IC lasers will be discussed.

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